

Galveston Causeway
Texas Historic Bridges Recording Project
Spanning Galveston Bay East of
Interstate 45
Galveston
Galveston County
Texas

HAER No. TX-37

HAER
TEX
64-GALV
43-

BLACK AND WHITE PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service
Department of the Interior
1849 C St., NW
Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

GALVESTON CAUSEWAY

HAER No. TX-37

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Location: Spanning Galveston Bay east of Interstate 45, between Galveston and Virginia Point, Galveston County, Texas.
UTM: 15/316660/3242290
USGS: Virginia Point, Texas, quadrangle (1994).

Date of Construction: 1909-1912.

Designer: Concrete Steel Engineering Company, New York, New York; Scherzer Rolling Lift Bridge Company, Chicago, Illinois (draw span).

Builder: A. M. Blodgett Construction Company, Kansas City, Missouri; Penn Bridge Company, Beaver Falls, Pennsylvania (draw span).

Present Owner: Galveston County.

Present Use: Railway bridge.

Significance: This reinforced concrete viaduct spans more than two miles between Galveston Island and the Texas mainland. Its original twenty-eight concrete arches and steel draw span were the first Galveston Bay crossing to withstand hurricane forces. The Scherzer rolling-lift span, since replaced, was one of the world's largest. Seventy-nine additional concrete arches, built from 1917 to 1922, replaced embankments washed away by a hurricane. Although designed to carry a roadway, an interurban line, and a railroad, the bridge is currently used for railway traffic only. The Galveston Causeway was listed on the National Register of Historic Places in 1976. ✓

Historian: J. Philip Gruen, August 1996. Revised by Barbara Stocklin, September 1998.

Project Information:

This document was prepared as part of the Texas Historic Bridges Recording Project performed during the summer of 1996 by the Historic American Engineering Record (HAER). The project was co-sponsored by the Texas Department of Transportation (TxDOT).

Completed in 1912, the Galveston Causeway was built to connect Galveston Island with the Texas mainland. The bridge was needed to replace two railroad trestle structures and a metal truss highway bridge destroyed by a devastating 1900 hurricane.¹ Subsequent to the 1900 hurricane, all traffic was handled by a single-track trestle of the Gulf, Colorado, and Santa Fe Railroad — the sole means of communication across Galveston Bay. In 1906, a committee of community leaders developed a plan to build a new permanent reinforced concrete viaduct across the bay at an estimated cost of two million dollars. The Concrete Steel Engineering Company of New York City designed the new structure. In 1907, the Texas legislature passed a bill authorizing Galveston County to issue bonds for the causeway's construction. The legislation also allowed the county to tax property owners for the retirement of the bonds, and to lease the right-of-way over the structure to steam and electric railway companies.²

Built from 1909 to 1912 by A. M. Blodgett Construction Company of Kansas City, Missouri, the Galveston Causeway consisted of a 2455'-0"-long concrete arch viaduct with a central lift span, flanked on either end by long stretches of earthen embankments. The completed structure stretched more than two miles across the bay and included 8,219'-9" of concrete-faced embankments (3,696'-5" on the Virginia Point end and 4,523'-4" on the Galveston end).³ To form the embankments, earth and sand fill was poured over concrete piles connected by tie rods and stabilized by a concrete retaining wall on the upper slopes. A centrifugal pump driven by a 200-horsepower motor was used to bring the fill three miles through a pipeline from Offats Bayou on Galveston Island to the construction site; two floating concrete plants were used for concrete work.⁴ The central viaduct consisted of twenty-eight reinforced concrete arches, of 70'-0" span and 9'-0" rise, with fourteen spans flanking either side of a Scherzer rolling-lift

¹ The metal truss bridge was the world's longest at its time of construction; see "The Galveston County (Tex.) Highway Bridge," *Engineering News* 31, No. 10 (March 8, 1894): 204-205.

² T. Lindsay Baker, *Building the Lone Star: An Illustrated Guide to Historic Sites* (College Station: Texas A&M University Press, 1986), pp. 92-94.

³ Ibid., p. 95.

⁴ "Construction Methods Employed in Building the Galveston Causeway," *Engineering Record* 66, No. 2 (July 13, 1912): 41.

drawbridge. The drawbridge, which extended 120 feet from center to center of pins, provided a 100'-0" clear opening for the passage of ships into Galveston Bay. The draw span was designed by the Scherzer Rolling Lift Bridge Company of Chicago and fabricated by the Penn Bridge Company of Beaver Falls, Pennsylvania.⁵ As completed in 1912, the drawbridge was one of the largest of its kind in the world. It weighed 3,293,000 pounds, 700 tons of which was steel and the remainder consisting of 500 cubic yards of concrete used as a counterbalance. The lift was operated by two 50-horsepower motors, originally powered by the electric interurban line. To support the drawbridge's enormous weight, a monumental concrete pivot pier was constructed. The 66'-0"-wide structure originally carried a two-lane brick-paved roadway, one electric interurban track operated by the Galveston-Houston Electric Railway Company, and two railroad tracks.⁶ Reinforced concrete balustrades form the outside railing and separate the roadway from the tracks.

A 1915 hurricane severely damaged the bridge's long earthen approaches, but left the central portion and its draw span intact.⁷ The county replaced the washed-out embankments with concrete arches similar to those in the viaduct's central portion. Reconstructed from 1917 to 1922, the re-built bridge featured fifty-one new concrete arch spans at the north end and twenty-eight at the south. New V-shaped reinforced concrete abutments were also added at either end of the structure. Except for replacement of the draw span in 1988, the bridge has had few alterations over the years.⁸ The current structure, extending more than two miles across Galveston Bay, consists of 107 concrete arches and a steel bascule span. In 1938, the Texas Highway Department (now Texas Department of Transportation) designed a new concrete highway bridge with a central moveable steel span, built by the Public Works Administration immediately east of the 1912 structure.⁹ In the early 1960s, the Texas Highway Department added a new high concrete bridge across the bay and raised the vertical elevation of the 1938 structure to eliminate its moveable span; together these two structures carry Interstate 45. Railway traffic continues to use the 1912 viaduct, but the roadway is closed to traffic.

⁵ For more about the Penn Bridge Company, see Victor Darnell, *A Directory of American Bridge-Building Companies 1840-1900*, Occasional Publication No. 4 (Washington, D.C.: Society for Industrial Archaeology, 1984), pp. 58-59.

⁶ "Construction Methods Employed," p. 41.

⁷ "Galveston Storm Damage," *Engineering News* 74, No. 10 (September 2, 1915): 472.

⁸ Maury Darst, "Causeway Drawspan Soon Will Be Replaced," *Galveston Daily News*, May 30, 1988, p. 4-A.

⁹ Texas Highway Department, *Eleventh Biennial Report* (Austin, Texas, 1938), p. 12.

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